

524,403

Rec'd PCT/PTO

11 FEB 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 February 2004 (26.02.2004)

PCT

(10) International Publication Number
WO 2004/017134 A1

(51) International Patent Classification:
G09G 3/19

G02F 1/15,

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:

PCT/IB2003/003030

(22) International Filing Date: 1 July 2003 (01.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
02078378.3 15 August 2002 (15.08.2002) EP

(71) Applicant (*for all designated States except US*): KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): JAGT, Hendrik, J., B. [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). WILLARD, Nicolaas, P. [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). JOHNSON, Mark, T. [GB/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

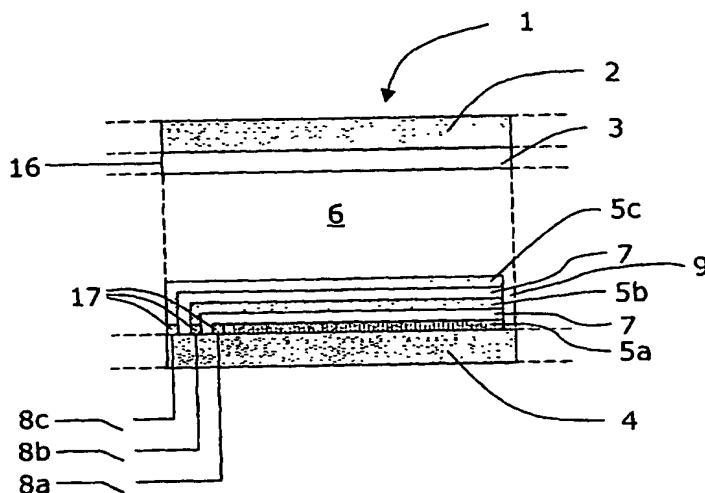
(74) Agent: VAN DEN HOOVEN, Jan; Internationaal Octrooibureau B.V., Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: FULL-COLOR ELECTROCHROMIC DISPLAY WITH STACKED IN CELL MONOCHROMIC ELECTROCHROMES



(57) Abstract: A display device comprising a plurality of independently addressable pixels (1) comprising: a first substrate (2); a counter-electrode (3); a second substrate (4); a stack of electrochromic layers (5a, 5b, 5c) associated with said second substrate (4); an electrolyte (6) disposed between said counter-electrode (3) and said stack of electrochromic layers (5a, 5b, 5c). Said electrochromic layers (5a, 5b, 5c) are each independently addressable for switching operation; and separated from each other by layers of an electrolyte (7). A driving method for operating said pixel (1) comprises the steps of: providing at least one power line (8) which is selectively connectable to an electrochromic layer (5) or a working electrode (10) associated with said electrochromic layer (5); selectively applying to said power line (8)

(8) a bleaching or coloring voltage; addressing the electrochromic layer (5) which is to be bleached or colored; connecting said power line (8) to said addressed electrochromic layer (5); retaining the connection of said power line (8) during a hold period; and disconnecting said power line (8).

WO 2004/017134 A1



ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— with international search report

INTERNATIONAL SEARCH REPORT

PCT 03/03030

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G02F1/15 G09G3/19

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 G02F G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC, IBM-TDB, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 847 860 A (LOWE ANTHONY CYRIL ET AL) 8 December 1998 (1998-12-08) column 1, line 40 -column 1, line 48; figures 2-11 column 4, line 30 -column 7, line 28	1-8
A	US 4 749 260 A (DURAND JR RICHARD R ET AL) 7 June 1988 (1988-06-07) cited in the application column 6, line 3 -column 8, line 24; figures 1-3	1-7
A	EP 0 950 568 A (MURAKAMI KAIMEIDO KK) 20 October 1999 (1999-10-20) paragraph '0017! - paragraph '0044!; figures 3,4	1-7
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

24 October 2003

Date of mailing of the international search report

05/11/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Kiernan, L

INTERNATIONAL SEARCH REPORT

PCT/ 3/03030

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>PATENT ABSTRACTS OF JAPAN vol. 006, no. 245 (P-159), 3 December 1982 (1982-12-03) -& JP 57 142617 A (FUJITSU KK), 3 September 1982 (1982-09-03) abstract</p> <p>-----</p>	1-7

INTERNATIONAL SEARCH REPORT

PCT/3/03030

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5847860	A	08-12-1998	NONE	
US 4749260	A	07-06-1988	US 4586792 A US 4842383 A US 5253100 A	06-05-1986 27-06-1989 12-10-1993
EP 0950568	A	20-10-1999	JP 2000002895 A DE 69905960 D1 EP 0950568 A1 US 6061168 A	07-01-2000 24-04-2003 20-10-1999 09-05-2000
JP 57142617	A	03-09-1982	NONE	